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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/939,422

08/24/2001

Jonathan Bernstein

112.222.130

2822

23483

7590

07/16/2004

WILMER CUTLER PICKERING HALE AND DORR LLP  
60 STATE STREET  
BOSTON, MA 02109

EXAMINER

MARTINEZ, JOSEPH P


ART UNIT

PAPER NUMBER

2873

DATE MAILED: 07/16/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 09/939,422	<b>Applicant(s)</b> BERNSTEIN ET AL.	
	<b>Examiner</b> Joseph P. Martinez	<b>Art Unit</b> 2873	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
  - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
  - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
  - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 26 April 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-84 is/are pending in the application.
- 4a) Of the above claim(s) 27,28,30-41,43-58 and 76-80 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-26,29,42,59-75 and 81-84 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 August 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All   b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 112***

Claim 29 recites the limitation "the package" in line 6. There is insufficient antecedent basis for this limitation in the claim.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 1, 2, 4-8, 11-14, 17-20, 24, 25, 59, 63, 66 and 73-75 are rejected under 35 U.S.C. 103(a) as being unpatentable over Haeberle et al. (6369400) in view of Neukermans et al. (6467345).

Re claims 1 and 59, '400 teaches for example in figs. 1A and 1B, an array of electro-magnetically actuated MEMS devices, each device comprising: a platform (1); a gimbal structure (4) for movably supporting said mirror about first and second axes (col. 1, ln. 66-67, wherein the office interprets "two degrees of freedom" to disclose movement in a first and second axes); a first coil pair (2) on the platform for causing selective movement of said platform about the first axis in the presence of a magnetic field (8) ; and a second coil pair (2) on the platform for causing selective movement of said

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platform about the second axis in the presence of a magnetic fields (8) each of said first and second coil pairs substantially filling the platform (col. 3, ln. 42-44).

But, '400 fails to explicitly teach the platform being a mirror having a reflective surface.

However, within the same field of endeavor, '345 teaches for example in fig. 5a, a mirror (82) having a reflective surface.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of '400 with the mirror plate of '345 in order to provide a reflective device for use as a scanner.

Re claims 6, 12 and 24, '400 teaches for example in figs. 1A and 1B, a magnetically actuated array apparatus, comprising: an array of electro-magnetically actuated MEMS devices, each device comprising: a platform (1); a gimbal structure (4) for movably supporting said platform about first and second axes (col. 1, ln. 66-67, wherein the office interprets "two degrees of freedom" to disclose movement in a first and second axes); a first coil pair (2) on the platform for causing selective movement of said platform about the first axis in the presence of a magnetic field (8); and a second coil pair (2) on the platform for causing selective movement of said platform about the second axis in the presence of a magnetic field (8), each of said first and second coil pairs substantially filling the area of the platform (col. 3, ln. 42-44); and an array of magnets (7.1 and 7.2) positioned proximate said array of MEMS devices for applying the magnetic field, each magnet of said array being associated with one of said platform devices.

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But, '400 fails to explicitly teach the platform being a mirror having a reflective surface.

However, within the same field of endeavor, '345 teaches for example in fig. 5a, a mirror (32) having a reflective surface.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of '400 with the mirror plate of '345 in order to provide a reflective device for use as a scanner.

Re claim 18, '400 teaches for example in figs. 1A and 1B, a magnetically actuated array apparatus, comprising: an array of devices generally arranged in a plane, each platform device comprising: a platform (1); a gimbal structure (4) for movably supporting said platform about first and second axes (col. 1, ln. 66-67, wherein the office interprets "two degrees of freedom" to disclose movement in a first and second axes); and actuation coils (2) for causing selective movement of said platform about the first and second axes; and an array of magnets (7.1 and 7.2) generally arranged in a plane proximate and parallel to said plane of said platform device array (col. 2, ln. 22-40), with each magnet being associated with one of said platform devices.

But, '400 fails to explicitly teach the platform being a mirror having a reflective surface.

However, within the same field of endeavor, '345 teaches for example in fig. 5a, a mirror (32) having a reflective surface.

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Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of '400 with the mirror plate of '345 in order to provide a reflective device for use as a scanner.

Re claims 2 and 60, '400 further teaches for example in figs. 6F to 6H, the first and second coil pairs (2) are superposed on said platform and are separated by a dielectric layer (75).

Re claims 4 and 62, '400 further teaches for example in fig. 1A, the coils (2) of the first coil pair are positioned on different sides of said first axis (vertical), and wherein the coils of the second coil pair are positioned on different sides of said second axis (horizontal).

Re claim 5, '400 further teaches for example in figs. 1 and 5, the magnetic field (8) is applied by an array of magnets (7.1 and 7.2) of alternating polarity (relative to the Y-axis, fig. 5).

Re claims 7, 13 and 19, '400 in view of '345 teaches the MEMS array as disclosed above.

But, '400 fails to explicitly teach the magnets are arranged in a checkerboard pattern of alternating north and south poles.

However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a single south pole magnet as opposed to

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providing two south pole magnets of figs. 1A and 5 since it has been held that forming in one piece an article which has formerly been formed in two pieces and put together involves only routine skill in the art. *Howard v. Detroit Stove Works*, 150 U.S. 164 (1893).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of '400 in view of '345 in order to provide a single south pole magnet, thus making a checkerboard pattern of alternating north and south poles in order to reduce the number of parts of south pole magnets.

Re claims 8, 14 and 20, '400 further teaches for example in fig. 5, said magnets include a first set of magnets having poles perpendicular to a plane (col. 2, ln. 22-40) on which said array of MEMS devices is arranged, and a second set of magnets having poles parallel to said plane (col. 2, ln. 22-40), and wherein said magnets (7.2) of said first set are arranged between magnets of said second set (7.1).

Re claims 11, 17, 25, 66 and 73-75, '400 teaches for example in fig. 1B and 4, the coil pairs are either on the top side (fig. 1B) or the bottom side (fig. 4) of platform (1). Furthermore, within the same field of endeavor, '345 teaches for example in fig. 2d, a mirror (32) having a reflective surface (col. 10, ln. 57-59) and the reflective surface is generally covering said coils.

Re claim 63, '400 further teaches for example in figs. 1A and 1B, the magnetic field is applied by one or more external magnets (7.1 and 7.2).

2. Claims 3, 23, 26 and 61 rejected under 35 U.S.C. 103(a) as being unpatentable over Haeberle et al. (6369400).

Re claim 23, '400 teaches for example in figs. 1A and 1B, a MEMS apparatus comprising: an array of electromagnetically actuated MEMS devices (1) on a substrate (6); and an array of magnets (7.1 and 7.2) positioned along a plane parallel to said substrate, said array of magnets including magnets (7.1 and 7.2) along each row of devices having a pole direction (N or S) parallel to said substrate (col. 2, ln. 22-40), and magnets between each row of devices having a pole direction (N or S) perpendicular to said substrate (col. 2, ln. 22-40) such that said devices are within a magnetic field (8) produced by said array of magnets.

But, '400 fails to explicitly teach MEMS devices arranged in rows.

However, '400 suggests the MEMS apparatus for use in a variety of different applications including optical beam scanners, integrated optical alignment systems, focusing systems and cameras (col. 8, ln. 59-67 to col. 9, ln. 1-2), wherein there is limited space for MEMS apparatuses and several MEMS apparatuses are needed.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of '400 to arrange the MEMS apparatuses in rows in order to maximize the space.

Re claims 3, 26 and 61, '400 teaches for example in figs. 1A and 1B, an array of electromagnetically actuated MEMS devices, comprising: an array of MEMS devices (1),



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each device comprising at least two coils (2) paired together on a single circuit (1) and being positioned each on a different side of a rotational axis of the device (fig. 1A), the coils together filling an available surface area (col. 3, ln. 42-44); and an array of magnets (7.1 and 7.2) of alternating polarities (N or S) positioned in a plane parallel to a plane containing said array of MEMS devices such that each such device is within a magnetic field containing primarily field lines (8) perpendicular to the plane of said array of MEMS devices.

But, '400 fails to explicitly teach MEMS devices arranged in rows and columns and with each coil being wound in opposite directions.

However, '400 suggests the MEMS apparatus for use in a variety of different applications including optical beam scanners, integrated optical alignment systems, focusing systems and cameras (col. 8, ln. 59-67 to col. 9, ln. 1-2), wherein there is limited space for MEMS apparatuses and several MEMS apparatuses are needed. Furthermore, it is well known in the art of electromagnets to provide coils wound in opposing directions.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of '400 to arrange the MEMS apparatuses in rows and columns in order to maximize the space and furthermore, to provide coils wound in opposing directions in order to have the flux through the coils in opposing directions for greater control of the platform.

3. Claims 9, 10, 15, 16, 21, 22, 42, 64 and 65 are rejected under 35 U.S.C. 103(a) as being unpatentable over Haeberle et al. (6369400) in view of Neukermans et al. (6467345) in further view of Behin et al. (6593677).

Re claim 42, '400 teaches for example in figs. 1A and 1B, a magnetically actuated array apparatus, comprising: an array of devices arranged in a plane, each device comprising: a platform (1); a gimbal structure (4) for movably supporting said platform about first and second axes (col. 1, ln. 66-67, wherein the office interprets "two degrees of freedom" to disclose movement in a first and second axes); actuation coils (2) for causing selective movement of said platform about the first and second axes; and an array of magnets (7.1 and 7.2) arranged in a plane proximate and parallel to said plane of said platform device array (col. 2, ln. 22-40), each magnet being associated with one of said platform devices.

But, '400 fails to explicitly teach the platform being a mirror having a reflective surface and means for determining the angular deflection of said mirror about said axes.

However, within the same field of endeavor, '345 teaches for example in fig. 5a, a mirror (82) having a reflective surface.

But, '345 fails to explicitly teach means for determining the angular deflection of said mirror about said axes.

However, within the same field of endeavor, '677 teaches for example, means for determining the angular deflection of said mirror about said axes (col. 4, ln. 46-52).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of '400 with the mirror plate of '345 in order to provide a reflective device for use as a scanner and further modify the apparatus of '400 in view of 345 with the means for determining angular deflection of '677 in order to control the angular position of the rotating element, as taught by '677.

Re claims 9, 10, 15, 16, 21, 22, 64 and 65, '677 further teaches for example, each device further comprises a feedback mechanism for determining the angular deflection of a respective mirror about one of said axes and wherein said feedback mechanism comprises an excitation coil fixed relative to the device and a detection circuit for sensing the relative proximity of one of said coils to said excitation coil (col. 4, ln. 46-52).

4. Claims 67, 69-72 and 81-84 are rejected under 35 U.S.C. 103(a) as being unpatentable over Haeberle et al. (6369400) in view of Neukermans et al. (6467345) in further view of Asada et al. (5606447).

Re claims 67 and 69, '400 teaches for example in figs. 1A and 1B, an electro-magnetically actuated MEMS array apparatus, an array of devices, each comprising: a platform (1); a gimbal frame (4) for movably supporting said platform about first and second axes (col. 1, ln. 66-67, wherein the office interprets "two degrees of freedom" to disclose movement in a first and second axes); a first coil (2) on the platform; and a second coil (2), said first and second coils for causing selective movement of said mirror about the first and second axes in the presence of a magnetic field (8), said first coil substantially filling the area of the mirror covered by the surface (col. 3, ln. 42-44).

But, '400 fails to explicitly teach the platform being a mirror having a reflective surface.

However, within the same field of endeavor, '345 teaches for example in fig. 2d, a mirror (32) having a reflective surface (col. 10, ln. 57-59).

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Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of '400 with the mirror plate of '345 in order to provide a reflective device for use as a scanner.

But, '400 in view of '345 fail to explicitly teach a second coil on the gimbal frame.

However, within the same field of endeavor, '447 teaches for example in fig. 10, a second coil (7A) on the gimbal frame (5A).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of '400 in view of '345 to include a second coil on the gimbal frame as taught by '447 in order to further increase two axes movement.

Re claim 68, '400 further teaches for example in figs. 1A and 1B, the magnetic field is applied by one or more external magnets (7.1 and 7.2).

Re claims 70-72, '400 further teaches for example in fig. 5, said magnets include a first set of magnets having poles perpendicular to a plane (col. 2, ln. 22-40) on which said array of MEMS devices is arranged, and a second set of magnets having poles parallel to said plane (col. 2, ln. 22-40), and wherein said magnets (7.2) of said first set are arranged between magnets of said second set (7.1).

Re claims 81-84, '400 further teaches for example in fig. 1B and 4, the coil pairs are either on the top side (fig. 1B) or the bottom side (fig. 4) of platform (1).

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Furthermore, '345 further teaches for example in fig. 2d, a mirror (32) having a reflective surface (col. 10, ln. 57-59) and the reflective surface is generally covering said coils.

### ***Response to Arguments***

Applicant's arguments with respect to claims 1-26, 29, 42, 59-75 and 81-84 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Ueda et al. (4421381) teaches in fig. 7 that it is well known in the art to have coils wound in opposing directions.

Neukermans et al. (6044705) teaches in col. 10, ln. 57-59 that is well known in the art to provide reflective coating on the front and backside of the mirror plate.

Song et al. (5748172) teaches in fig. 6 that it is well known in the art to provide MEMS apparatuses in rows and columns.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph P. Martinez whose telephone number is 571-272-2335. The examiner can normally be reached on M-F 7:00 AM to 3:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Georgia Y. Epps can be reached on 571-272-2328. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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JPM  
7-12-04



Hung Xuan Dang  
Primary Examiner